The present invention, defined, for example, in claim 1, includes a sighting arrangement having a laser aligned to illuminate a diffractive optical system to provide a diffraction pattern in the form of a light intensity distribution to identify and outline the size of the measurement spot by means of visible light. Examples of the patterns generated are depicted in Figs. 2c, 2e, 2d, 2g and 3e. All of these diffraction patterns project laser light onto the energy zone.

The examiner states that in Hollander, at figs. 5 and 10, the laser device includes a means for simultaneously emitting a plurality of more than two laser beams towards the surface to outline the energy zone. Also, it is pointed out that at col. 6, lines 49-51, Hollander states that individual lasers or laser splitting devices can be used to split a single laser beam. The examiner further states that Hollander does not teach a sighting arrangement having a diffractive optical system, but concludes that replacing the beam-splitter of Hollander with a diffractive optical system would have been obvious because such system are equivalent and alternative devices for creating an image from a beam of light.

This rejection is respectfully traversed for the following reasons. In the following, all references to the present application are to the originally filed specification. The devices illustrated in Hollander at figs. 5 and 10 are designed specifically to outline only the periphery of the energy zone as specifically pointed out in the claims and is apparent from the structure of those devices.

In contrast, as pointed out at page 6, last paragraph, of the present application, the intensity distribution of a diffraction pattern produced by the diffraction grating is composed of a point in the center (0th order), a first intensive circle (first order) and further less intensive circles of greater diameter (higher orders). As stated at page 7, second paragraph, only approximately 80% of the energy emanating from the light sources lies in the diffractive patterns produced by the diffractive optical system. The remaining energy is distributed inside and outside the measurement spot.

Thus it is apparent that the structures of the laser sighting arrangements of Hollander do not make obvious the claimed structure. In Hollander the laser sighting devices are complicated structures which outline only the periphery of the energy zone. The claimed laser sighting device is a simple structure that generates a diffractive pattern having a light intensity distribution with major components inside and outside of the energy zone. It was realized by the inventors of the present invention that projecting laser light into the energy zone would not change the readings of radiometer due to the insignificance of the thermal energy introduced into the energy zone.

Also, the visibility of laser alignment spots in various conditions is a major concern for real-world designs. The alignment spots must be visible in bright light or smoky conditions. Accordingly, designers attempt to utilize all available visible light energy to define the energy zone. Only a portion of the visible light energy incident on the diffraction grating is actually channeled into the portion of the diffractive pattern that outlines the energy zone. For example, in Figs. 2c and 2d of the present application, the light energy in the center spot 2c is not utilized to outline the energy zone. Thus, the intensity of the spots in the circle 3b is diminished due to the energy focused in the center.

The present inventors realized that the diffractive system could still be utilized in the laser sighting device despite the fact that part of the light incident on the diffractive grating was directed away from the pattern outlining the energy zone.

As the examiner, being versed in the art, realizes, cost competition in radiometers is intense. The use of a diffractive element results in an efficient radiometer sighting device and the design has been adopted in the art subsequent to the filing of the present application despite the above-described disadvantages of using a diffraction grating.

There is no teaching in Hollander that would suggest substituting the diffractive optical system for the structures disclosed in that devices. The diffractive optical system

would not meet the design goals described in Hollander of outlining only the periphery and having all the laser light concentrated into the projected shape for outlining the periphery.

Claims 1 and 3 are rejected under 35 U.S.C. §103(a) as being unpatentable over German patent document 32 13 955 in view of British patent document 2 203 537.

The German document discloses a laser sighting arrangement utilizing a single laser and a beam- splitter including a beam-splitter 8 in the form of a half-silvered mirror or prism for splitting a single beam into two components. Deflecting mirrors 7 and 7' align the two beams to define the measurement spot at different distances.

The British document discloses a sighting arrangement having a visible light source which emits a cone of light. A masking element is place in front of the light source to block out light which would be projected onto the energy zone. The image of the masking spot coincides with the energy zone so that the energy zone is surrounded by a ring of light.

The examiner states that it would have been obvious to modify the system disclosed in the German document by replacing the beam-splitter thereof with a system that creates a circle to outline the energy spot because the British document teaches that a circular outline of the energy zone provides valuable information. It is also stated that to utilize a diffractive optical system to generate the circular outline is obvious because all beam-splitter are alternative and equivalent devices for creating a plurality of beams from a single beam so that any beam-splitter could function in the device disclosed by the German document.

This rejection is respectfully traversed for the following reasons. As discussed above, all beam- splitters are not equivalent when utilized in a laser sighting device. It is important to consider whether visible light will be projected into the energy zone and the amount of visible light energy not utilized to outline the energy zone.

Further, the British document expressly teaches that visible light is not to be projected into the energy zone. At page 4, last paragraph, it is stated the masking patch is inserted to "prevent the test result from being distorted by the illumination of the target area 24 with visible light".

Accordingly, the teachings of the German and British patent documents would not make the claimed invention obvious. There is no teaching in the German document of generating more than two beams. In fact, it would be impractical to modify the beam-splitter arrangement disclosed to generate and accurately align more than two beams. Additionally, the British document would teach away from using a diffractive optical system because such a system would project light onto the energy zone.

Therefore, none of the references singly or in combination, would have made the claimed combination obvious. All the references disclose discrete beam-splitter arrangements. There is no disclosure of utilizing a diffractive optical system to provide an light distribution to outline and identify the measurement spot.

Further, all the references disclose optical systems which outline only the periphery. Thus, the use of a diffractive optical element, which inherently generates diffractive pattern having a light intensity distribution with a component that illuminates the energy zone, would violate the limitations placed on the laser sighting devices by those references.

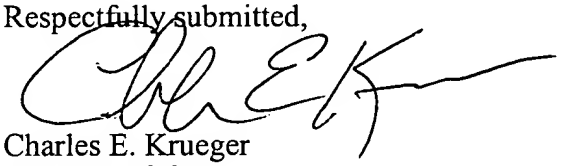
Additionally, subsequent to the filing of the present invention, designers of laser sighting systems are increasingly utilizing diffractive optical systems having realized, subsequent to the filing date, that 1) the advantages of utilizing such a system reduces the cost of the system and that 2) the amount of visible light energy focused onto the energy zone by the diffractive system does not significantly affect the accuracy of the temperature measurement process.

CONCLUSION

In view of the foregoing, applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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